

EPSON 7900 & 9900

User Report

by Julian Mussi

© Spectraflow, Inc.
415-382-8681

Nov 2008



Introducing the Epson Stylus Pro 7900 and 9900

In May Epson announced two new professional inkjet printers, the Stylus Pro 7900 (24") and Stylus Pro 9900 (44"). Far from a simple update to the existing 7880 and 9880, these printers form a separate product line, with Epson continuing to produce the x880 series. The new models build upon the existing X880 series while introducing some fairly innovative functionality. Many of the changes are focused on improving speed and reducing operating costs. At the same time Epson has expanded the color gamut with the new Ultrachrome HDR ink set featuring an orange and green ink. One very welcome change is that the new printers have been designed to allow both the Photo and Matte blacks to be loaded in the printer at all times, and switching between blacks is now a simple and quick process. The paper feed system has also been totally redesigned, including the cutter. Additionally, Epson is also offering an optional spectrophotometer as an accessory for the printer. Overall, Epson has made some bold moves in the design of this printer without compromising those elements that have made their professional printers so successful in so many markets.

The chart below highlights some of the differences between the X880 and the X900.

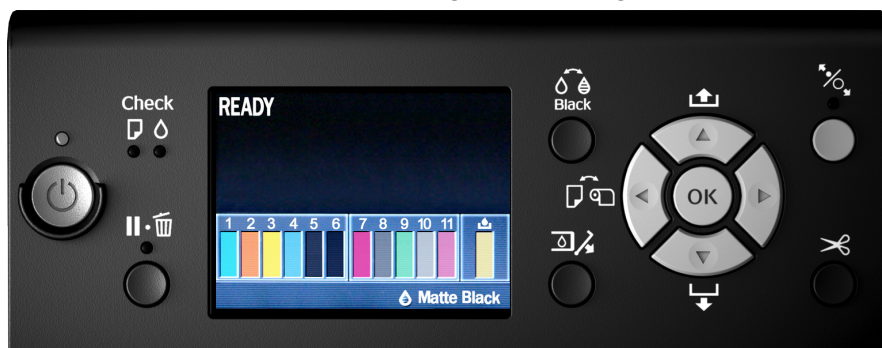
	Epson 7900/9900	Epson 7880/9880
MSRP	\$3995/\$5995 (without spectro)	\$2995/\$4995
Inks	C,lc,M,lm,Y,PK,MK,LK,LLK,O,G	C,lc,M,lm,Y,PK,MK,LK,LLK
Inkset	Epson Ultrachrome HDR	Epson Ultrachrome K3 vivid magenta
Auto cleaning and nozzle verification	Yes	No
Print Head Nozzles	360	180
Max Ink Cartridge size	700	220
Auto Black Switching	Yes	No
Dimension & Weight	53.4/73.4 X 26.3 X 48 186lbs/255lbs	53/67 X 30 X 46 131lbs/198lbs
Print time 16x20 @ 720 dpi	3:47 min	6:41 min

Printer Hardware

The 900 series have a distinctive look that announces their break from the 880 series printers. The x900 is much more rectangular and considerably more bulky, giving it a more industrial feel. The visual change also results in some basic functional changes. Gone is the ubiquitous paper release lever, and the ink compartment drawers are also now locked, and must be released from the control panel. Connectivity is identical to the x880, featuring a USB 2.0 port as well as a 10/100 BaseT ethernet port. A second USB port located on the back of the printer provides a dedicated connection to the optional SpectroProofer. One thing that hasn't changed is that like the X880 series printers the X900 ships with 110ml cartridges, even though the smallest cartridge size sold for the X900 is 150ml. The stand and paper tray have also received a minor makeover. It is worth noting that Epson has not announced a 17" model of the x900 series, so the 4880 will remain the top of the line 17" product for the time being.

Control panel

While I don't generally consider the printer control panel of vital importance, it has been significantly upgraded on the X900. Perhaps most striking is the change to a full color display. I'm not really sure how useful this is,

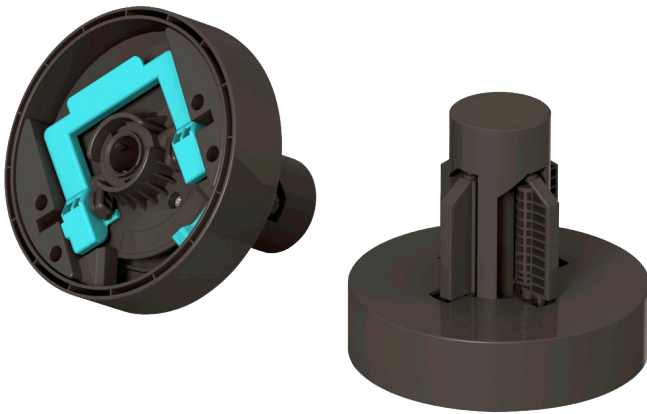


but it certainly looks great, and it makes identifying which inks are low much simpler. Compared to the X880 the menu options are quite similar, making it familiar territory for current Epson users. The paper selection portion of the menu is the notable change. Like HP and Canon, the X900 printers require that the paper being loaded be selected from a list on the printer. This list includes all standard Epson papers as well as options for

“custom” papers. I found it quick and simple to select paper type from the list. This information is communicated to the driver and helps to ensure that the correct ink and platen settings are used when printing. Navigation

in general was simple and the inclusion of animations on the screen aids users in performing simple tasks such as loading the paper or changing inks.

Paper feed system



Epson's media handling system has always been very straightforward and has seen little change over the last 10 years. The simplicity of the system was its strength, and while I'm not generally a fan of fixing things that aren't broken, the new media handling system on the 900 series is really nice.

My favorite change is the lack of a paper spindle. Instead, the roll adapters are placed in the end of the paper roll and locked in place with a lever. Once secured, the roll is placed directly in the printer's roll holder. To accommodate different paper sizes the left roll holder moves on a track.

On the 9880 the 44" spindle has, upon occasion, had "issues" with overhead lights, so this is a welcomed improvement. After using it for a few hours I kept thinking "why didn't someone think of this earlier!"

The new system also utilizes an automatic paper feed system. All that is required to load a roll is to feed a small amount of media into the printer, and then with the push of a button the printer automatically advances the paper. The system can correct for small amounts of skew, and I found it to be fairly forgiving and easy to load. The system also automatically winds the slack out of the roll and provides back tension. The 9900 also has an optional take up reel for heavy production environments.

Another new feature on the X900 is end of roll encoding, a system that keeps track of roll length and paper type. It does this by printing a bar code-like strip on the end of a roll before it is removed from the printer. The next time the roll is loaded the printer will automatically retrieve the paper type and remaining length of the roll. This is very handy when printing on multiple paper types, but can also be disabled if not required.

In my opinion the media handling on the 900 series is second to none. It's also good to note that the printer still accepts media up to 1.5 mm thick.

Cutter

This is an feature that at first seems so minor as to barely merit mention, yet in reality is a significant improvement. The paper cutter in the X900 has switched from a blade, to a self sharpening rotary cutter, giving it a number of distinct advantages over the previous system. First, it allows the printer to make lightning fast cuts in a single pass. The second improvement is that it can now cut through heavy fine art papers and even canvas. For fine art printers this is a big time savings! No more sloppy hand cuts resulting in expensive media waste. You can now send 4 canvas prints to the printer, go to lunch, and when you return have four cut sheets in the paper bin. Lastly, by placing the cutter in a different section of the printer than the print head, the paper dust from the cuts are less likely to attach to the print head and cause nozzle clogs - a potentially big deal!

Noise

This is another advertised feature I didn't give much attention, but I've grown to appreciate this change. The first time I made a print on the 7900 I had to walk over to the printer to make sure that it was actually printing. Like the X880 series, the suction is louder when the printer first begins to print but is then reduced. On the

X900 after several seconds the printer is almost silent. The fan can just barely be heard and the print head is virtually silent. Even the cutter is quieter. Not a major issue for most, but a nice change regardless.

Print head

The print head in the X900 is a slightly modified version of the one in the 11880. Compared to the x880, this head features a higher nozzle density, which as well as other less obvious internal changes designed to increase print efficiency and make the head less prone to clogs. The minimum drop size is still an astoundingly small 3.5 picoliters.

Speed

One of the most appreciable benefits from the changes to the print head is that the X900 is nearly twice as fast as the 7880 and 9880, even beating out the 64" 11880. It is also much faster than the Z3200 at comparable quality settings. The enhanced screening allows the printer to produce exceptionally high quality results at 720 dpi. The improved clog detection and simpler method of aligning the print heads should allow for use of the high speed setting without introducing horizontal banding. All of these improvements allow for a very fast printer.

I think Epson is somewhat unique in creating such an un-compromised mix of speed and quality. This versatility should help to insure that these printers find acceptance in a wide range of markets.

Spectroproofer

The SpectroProofer is an accessory unit from Epson that adds an automated X-Rite spectrophotometer to the printer. HP shook up the industry by integrating a spectrophotometer on all of their Z-series printers. This allowed for automated linearization, and automated profile creation on most models. While Epson is obviously responding to this, they have taken a different path by selling the unit as an accessory and pricing it the way they have.

At the heart of the SpectroProofer is the ILS20 spectrophotometer. Using a tungsten light source, the unit is available in either UV or non UV-filtered models. There is also a user swap-able black or white backing plate. While the ANSI standard is a black backing, most people perform measurements for calibration and profile building with a white backing.

Measuring a single line of patches the Epson's solution is much faster than the HP version. The SpectroProofer can read 15 patches per second, per line. The calibration patches are much smaller than those produced on the HP Z-series, and therefore both print faster and use much less paper. Unfortunately, these speed advantages are reduced since the SpectroProofer locks a retractable guide over the paper before each measurement pass. The need to raise the guide, advance the paper and then lower the guide for each pass results slows the measurement process. The actual measurement times for reading a standard profiling chart were similar to that of the Z3200. The total time print and measure the chart, however, was much less on the X900 because of the smaller patch size and better speed on the X900.

The software that accompanies the SpectroProofer has limited functionality and is definitely targeted towards the proofing and production markets. In fact, the SpectroProofer can only linearize the printer and measure charts out of the box, ICC profile creation is not an option.

Linearization

The linearization option is specific to media and resolution, although the user is given the option of linearizing all resolutions in a row. To linearize, 720, 1440, and 2880 takes about 45 minutes. A single resolution takes about 15 minutes, which is similar to the time it takes the HP to perform the same function. I like printers that are able to re-linearize, it ensures that printer drift is held in check and provides piece of mind for high end users. It is worth noting, however, that on their web site Epson is promoting improvements in their manufacturing process that have “eliminated the need for internal calibration devices.” This is intended to ensure that all professional printers, within a given model, closely match one another. We have generally found this to be the case, which calls into question the usefulness of linearizing using the Spectroproofer.

Chart Measurement and job verification

The Spectroproofer applications are all wizard driven and nicely organized. For measurement jobs the software presents several standard profiling chart options, as well as allowing custom charts to be select. Once the chart is selected and printed, it is automatically measured and saved as a CGATS compatible measurement file. What should be clearly stated here is that while the measurement file contains all the information needed to create an ICC profile, *the profiling software required to process that file is not included*. The assumption behind this is that most people purchasing the SpectroProofer will already own a 3rd party profiling package or have a RIP with profile creation options. I’m not totally on board with this reasoning. While most RIP’s provide the option of building profiles it is often an additional feature that can easily cost over a \$1000.

The SpectroProofer also has a nice system for job verification, and will be useful for the proofing market. The wizard driven process is simple, allowing a selected chart to be measured in conjunction with a proofing job. When printed, the bar is then measured by the SpectroProofer. The measured results are then compared to the target values and the Delta-E is calculated. Tolerances can be set inside the software and a Pass or No Pass is then printed below the color bar.

The Spectroproofer is also designed to integrate with 3rd party RIP solutions. In this capacity it can perform the measurements needed to perform printer linearizations, and with the proper support, ICC profile creation. Most of the RIP vendors I talked to were planning on supporting the Spectroproofer.

For the most part I like the SpectroProofer. It appears well-built and integrates nicely into the printer. In addition to its measurement functions, it also includes a fan to speed up the drying time of prints, as well as temperature monitor. It does have limitations that may limit its appeal in some markets. For one it’s not cheap. At \$1500 for the 24” model it’s around the same price as an Eye-One Photo package. However the 44” is an additional \$1000, creating a \$2500 accessory, which is almost half the cost of the printer. And for \$2500 bucks I would expect the unit to ship with profiling software, even something basic. The fact that measurements are done in-line is nice, but the speed of the unit is somewhat slow. The linearization option seems logical but if the printer is so stable, do I really need to linearize? In conclusion, I don’t think it is a great fit for the photo market, and to be fair it hasn’t been marketed towards this group. Where the SpectroProofer will likely find acceptance is in the high-end proofing market.

Operating Cost

Ink Wastage/Nozzle Clogs

I know that ink costs get the most attention when factoring the cost per print, but there are other factors that should also be considered. In the past Epson printers have been fairly loose about ink wastage. The main reason behind this was the reliance on aggressive ink purges to maintain the print heads. This was especially true in the early generation of printers, where nozzle clogs happened often. The X900 benefits from numerous improvements to the print heads that help to reduce, although not completely eliminate clogged nozzles.

The X900 also incorporates an automated clog detection systems, a paperless method that uses light to detect clogged nozzles. If clogged nozzles are detected the printer will automatically run a head cleaning cycle, and then verify that the clogs were removed. This system is more elegant than reading printed patches to detect clogged nozzles, and should further reduce wasted paper and ink.

Auto Switching Blacks

One of my only long standing complaints with Epson printers has been the requirement that users manually swap black inks in order to get maximum quality on both matte and photo papers. The time required to complete this switch was a hassle and could easily take 20 minutes, requiring levers be raised and lowered and a set of drainage tanks be inserted and removed. Then there was the cost associated with the ink wastage, around \$50, making the whole process simply impractical for most users. I am very pleased to report that Epson has finally done away with this.

The solution is essentially the same as employed with the Epson Stylus Pro 3800. While the black inks still share a single print head, both blacks are now simultaneously loaded in the printer. The switch between inks still uses a small amount of ink, but this has been reduced to less than 3ml of ink and takes only a few minutes. The whole process can be initiated from a button on the control panel or the printer will prompt you to change black if a paper is loaded that calls for a different ink than is selected. This new system is very nice, and will make the printers even more welcome in the fine art market.

Ink Tank Options

Typically the larger the ink tanks, the cheaper the ink, and this is definitely the case with the optional 700 ml tanks on the X900. Running about \$0.10 cheaper per ml than the Z3200 and 7880, that translates to roughly 20% lower ink costs. I also like that there are 3 different tank sizes, and the printer allows mixed sizes to be loaded. Users concerned that the 700ml tanks will expire before being used completely might consider using the larger sized tanks only with the light colors. Even the 350 ml tanks represent a significant cost savings compared to the 150 ml tanks, which are not a great deal at \$0.59 a ml.

Below is a chart comparing ink cost using MSRP.

	HP DESIGNJET Z3200	Epson 7/9880	Epson 7/9900
Number of installed inks	11 colors 1 gloss enhancer (GE)	8 colors	11 colors
Ink cartridge size	130 ml	110/220 ml	150/350/700 ml
MSRP cost per cart	\$83 single / \$62 GE \$132 double/\$99 GE (\$66 each)/(\$49.5 GE)	\$70 for 110 ml \$112 for 220 ml	\$89.95 for 150 ml \$159.95 for 350 ml \$279.95 for 700 ml
Total volume of ink in printer	1560 ml	880 (110 ml carts) 1760 (220 ml carts)	3850 ml (350 ml carts) 7700 ml (700 ml carts)
Cost per replacement set	\$975 single \$1551 double	\$560 for 110 ml \$896 for 220 ml	\$1759 for 350 ml tanks \$3079 for 700 ml tanks
Cost per mil of ink	\$.62 for single \$.49 for double	\$.63 for 110 ml \$.51 for 220 ml	\$.46 for 350 ml \$.40 for 700 ml

Ultrachrome HDR

In the beginning there was Ultrachrome. Ultrachrome K3 added the light light black, and K3 with Vivid Magenta saw a reformulation of the magenta and light magenta inks. The Epson X900 showcases the latest Ultrachrome variant, dubbed Ultrachrome HDR (High Dynamic Range). This new version adds an orange and green ink to the mix. At the same time the ink set features an improved pigment encapsulation that is supposed to eliminate bronzing and gloss differential. Gloss differential seems virtually nonexistent. Bronzing is still present, although it is fairly minimal. While the HP Z3200 manages to eliminate bronzing using a clear gloss enhancer, this increases the total amount of ink used considerably. Epson has struck a different balance by significantly reduced bronzing, without the need for any sort of coating.

Orange and Green

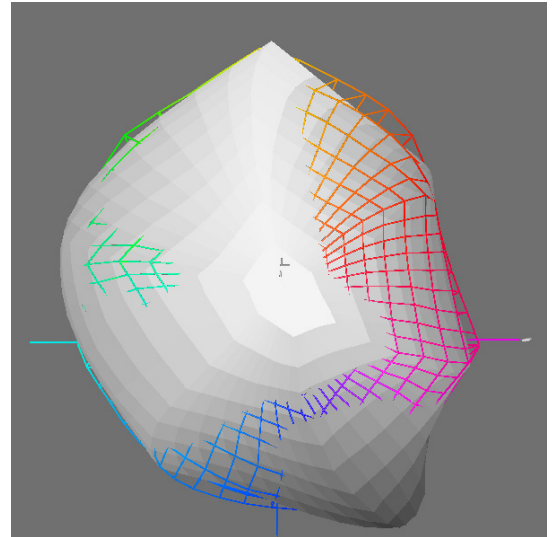
The added inks are designed to expand the gamut, and this is fully examined below. However, the added inks have other advantages. They help to reduce ink costs since the printer can now produce green using a single drop of green, rather than mixing yellow and cyan. They also help produce more uniform solid colors and improve tints and transitions. Epson's screening on the X880 series printers was exceptional and I'm happy to report that it is as good if not better on the x900. The improved screening means that these printers can produce very high quality results at 720x720dpi and benefit from the speed afforded by this resolution.

Gamut Comparisons

While they don't tell the whole story, I've included several gamut plots in this review. The plots are useful in showing the general shape and size of the printer's gamut. Compared to the Epson X880, the X900 shows a dramatic expansion in gamut in the orange and green regions, exactly what you would expect from the added orange and green inks. This advantage is most evident in the midtones and 3/4 tones. When compared to the Z3200 it's much harder to draw any meaningful conclusions from the three-dimensional plots. The X900 and Z3200 excel in different areas, and overall the differences are fairly small, although the total gamut volume of the x900 is larger than the Z3200.

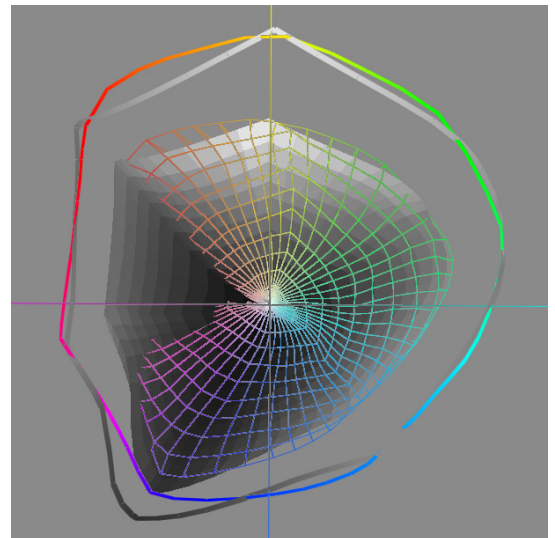
To fully evaluate the output produced by the 7900, I made a number of prints which were then printed on the Z3200 and Epson 7880. The test prints were made on both photo and matte papers using both custom and canned profiles and different rendering intents. The images featured both photographic imagery and test imagery such as color ramps and rainbows. After carefully digesting all of the results, I came to the profound conclusion that all of the printers tested produced excellent results. That's not intended as a cop out, but rather the endorsement of a belief that the aqueous inkjet printer has reached a level of maturity. That said, I don't want to imply that there aren't differences between printers or objective improvements, simply that in regards to color gamut the benefits will not be appreciated by every user. The subtle difference in the test prints were almost completely invisible unless the images were in the ProPhoto RGB color space.

Epson 7900 Prem Luster - Color Wire Frame
HP Z3200 Pro Satin - Solid White
Top view



Epson 7900 Prem Luster- Color Wire Frame
HP Z3200 Pro Satin - Solid White

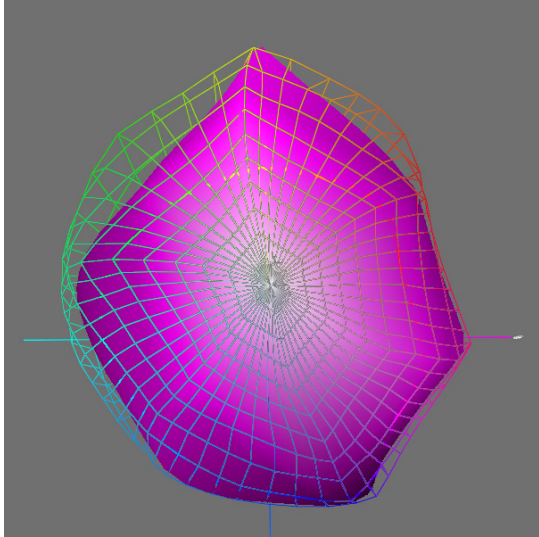
Lower view



Looking at a large collection of prints it would be difficult to say that any printer consistently produced the best prints. The greens were more saturated on the 7900 and Z3200 than those produced on the 7880. The 7900 hold more saturation in the shadows, while the Z3200 produced marginally punchier bright greens. In a few specific cases, the Z3200 produced a red that was perceived as more saturated than the Epson's. Interestingly, the blue on the 7880 produced consistently good results, while the Z3200 had a tendency to produce slightly purple blues.

Epson 7900 Prem Luster - Color Wire frame
Epson 7880 Prem Luster - Solid Magenta

Top view



For the proofing market the gamut improvements translate into more spot colors that can be reproduced. For packaging, flexo proofing and textile design the expanded gamut is welcome. Standard SWOP/GRACoL proofs for press proofing are achievable on the X880 series printers as well as the 7900.

While not a specific attribute of the HRD ink set, the Epson pigment is generally very compatible with third party media.

Overall I would say that the for the photographer the expanded gamut offered by the x900 is not reason enough to justify upgrading from a 7880. Nor would I suggest that gamut should be a significant factor in choosing between an Epson 7900 and a Z3200.

Print Permanence

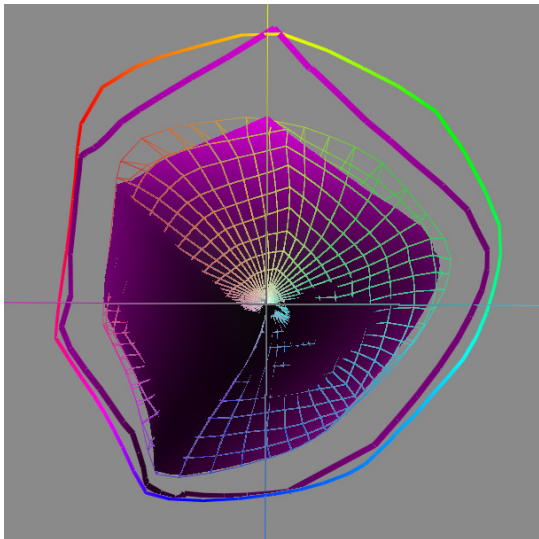
Wilhelm Imaging Research is one of leading resources on print permanence. They regularly evaluate the professional printers and publish the results on their website, <http://www.wilhelm-research.com>. These results often form the basis for the permanence claims by the manufactures, including Epson.

As of November, 2008, Wilhelm has not publicly released a complete set of results for the x900, but initial findings show the printer to be essentially the same as the x880. Listed below are the figures for the 9880, which should be a good indication of the X900 prints.

One thing to note is that often times only the framed UV ratings are given. As you can see the from the chart below the unframed prints can have a significantly shorter lifespan, as will prints not protected under UV filtered glass. Black and white prints on this series of printers should be extremely stable regardless of the display conditions. Even unframed color prints are comparably quite archival, in many cases lasting twice as long as comparable traditional silver halide prints.

Epson 7900 Prem Luster - Color Wire frame
Epson 7880 Prem Luster - Solid Magenta

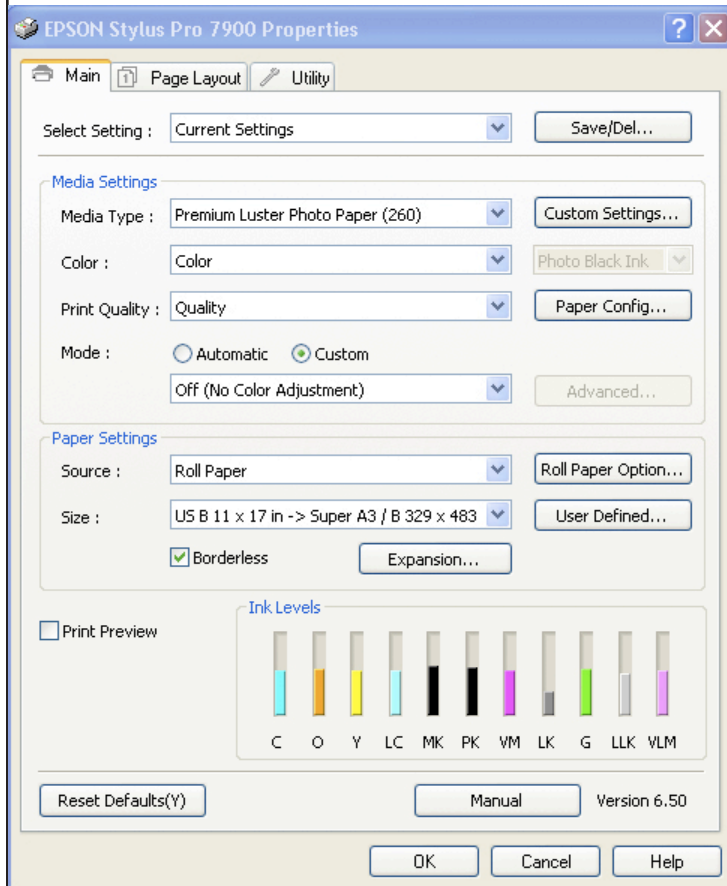
Lower view



	unframed	framed under glass	framed under uv glass
Prm Glossy 260	60	85	98
Prm Glossy 260(B/W)	100	200	250
Prm Luster 260	45	85	200
Prm Luster 260(B/W)	315	315	315
UltraSmooth FA	57	108	175
UltraSmooth FA(B/W)	140	205	395

Printer Drivers and MyEpson.com

The Drivers found on the x900 are very similar to those for the x880 printers. One nice change is that the driver will now intelligently sync with Photoshop CS3/CS4. If color management is set to "Photoshop Manages Colors" in Photoshop the driver will automatically disable printer color management, avoiding color management conflicts. The Mac driver now also supports 16 bit input when printing from OS X 10.5. This option does give the driver more data from which to create the screening; however, any real world advantage is likely to be quite minimal.

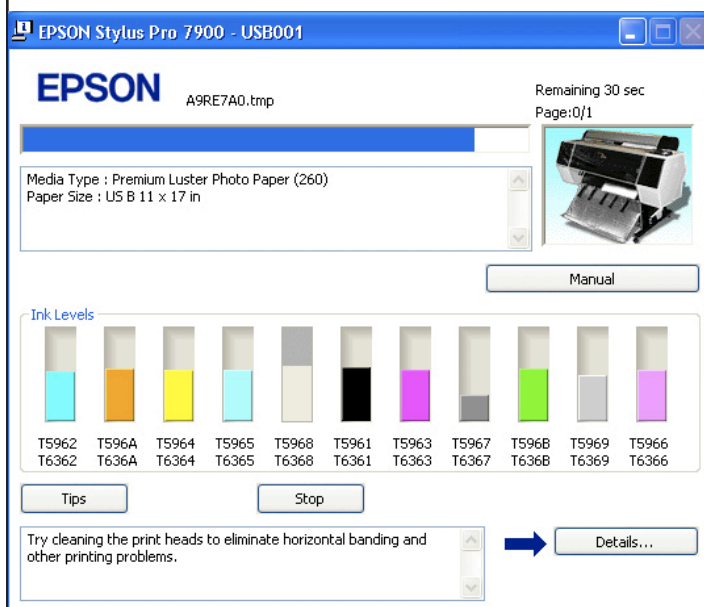


From the printer utility you can also manually initiate nozzle checks, head cleaning and alignment. A new option now also allows users to create, manage, and sync custom paper types with the printer.

The Epson driver is also where the Advance Black and White mode is controlled. Because the Epson black is not perceptually neutral it must be combined with other inks to produce a neutral tone black and white. The advance Black and White mode combines special screening and a carefully controlled mix of color inks to produce very good looking black and white prints. There is also the option of custom toning the prints to give them a warm or cool tone.

My EpsonPrinter.com (coming soon)

MyEpsonPrinter.com is a web-based service for managing Epson printers. We've had a chance to test the beta of this service and it looks like it holds a lot of promise. The service allows for basic tasks such as checking the ink levels of a remote printer as well as tracking jobs and print costs.



While some of the functionality may be overkill for small businesses with a single printer, it provides administrators a number of tools to track and manage a fleet of widely distributed printers across an entire organization. Since the service is hosted web based, there is some question about how it will work with corporate intranets with tight security policies. MyEpson-printer.com is under free public beta until March 2009. It supports both the x880 and x900 series.

Summary

Until recently Epson has really only had one professional printer, with 17", 24", and 44" variations. I think it's testament to the success of their design that they were able to dominate the fine art markets and large portions of the proofing market. Over the last ten years they have continued to refine the pro line to the current X880 series. Starting this year Epson has begun to expand from their single printer line, first with the eco solvent GS6000 and now with the 900 series printers.

This new model line inherits many traits from the X880, and while it includes numerous advantages, still manages to feel distinctly Epson. For this I'm glad. They managed to take fairly significant evolutionary step without completely starting from scratch. The black swapping has been successfully resolved to make using both blacks practical for the first time since the Stylus Pro 4000. I like the paper feed system immensely, and the heavy duty paper cutter is a real time saver as well.

Almost all of the modifications on this printer have been done with an eye to improving the efficiency, speed and operating costs, so it was surprising to see the new ink set incorporated into the printer as well. The result is arguably Epson's best photo printer. I think it's equally appropriate to categorize the X900 as an extremely fast photo printer, or an extremely high quality production printer.

That said, the Epson x880 is still an excellent product, and the X900 is clearly going to be competing with the lower cost model. In this case, the X900 will be the clear choice for any high volume production environment. The ability to use the larger sized 700 ml cartridges is a clear advantage, as is the printer's improved speed. The fact that the benefits of speed are accompanied by easy switching between blacks and an improved cutter make them well-suited for high end photographers and fine art printers. Coupled with the SpectroProofer the printers should also be ideal proofing printers, especially where Pantone and spot colors are often used. I have mixed feelings about the SpectroProofer specifically. It seems to be a well-designed device that, when coupled with a supported RIP, should suit its target market. That said the cost of the unit is somewhat steep and its limited software package makes it impractical for photographers and fine art printers.

I really like the X900 series, and I'm at a bit of a loss to find any profound weaknesses with the printer. Compared to the HP Z3200 with its gloss enhancer, the X900 still has some lingering issues with bronzing. Also, while the X900 has a larger color gamut overall, the HP Z3200 is still stronger in some regions. In terms of color gamut the two printers are so capable as to make general gamut comparisons somewhat academic. What really makes the Epson X900 printers stand out is that they are able to blend speed and quality without compromising in either aspect.

Strengths

Lowered Ink Waste - No need to manually swap black cartridges.

Color Gamut - About as good as it gets for pigment inks.

Black and White Print Quality - Very good using advanced black and white mode.

Print Quality - Very deep blacks, works well with 3rd party papers.

RIP Support - Epson printers are supported by virtually every RIP vendor.

Speed - Very fast printer while still producing photo quality.

Ink Tank Size - 150ml, 350ml, 700ml tank sizes provide options and help reduce cost.

Paper Feed System - Best roll handling system I've worked with, roll length tracking works well.

Cutter - Cuts through just about everything!

Weaknesses

Maintenance - Printer still has a few head clogs and wastes small amounts of ink when swapping blacks.

SpectroProofer - Device works well but limited software package and price reduces value.

No 17" version - As of this time there is no indication that a 17" model will be released.

Bronzing - Minor but still present.